What is claimed is:

1. A charging voltage measuring apparatus for measuring a charging voltage Vs on the surface of a substrate on a substrate holding unit, comprising:

a measuring electrode, for forming an electrostatic capacity Cs with said substrate, being disposed on said substrate holding unit to make contact with or proximate to the back face of said held substrate, and said measuring electrode being electrically insulated from said substrate holding unit;

a measuring capacitor connected between said measuring electrode and a ground potential portion, said measuring capacitor having an electrostatic capacity Cm;

a voltage measuring unit for measuring a measuring voltage Vm between both ends of said measuring capacitor; and

a calculating unit for calculating said charging voltage Vs in accordance with a following numerical expression 1 or its mathematically equivalent numerical expression on the basis of an inverse K of a voltage dividing ratio that is defined by the relation of said electrostatic capacities Cs and Cm and said measuring voltage Vm.

[Numerical expression 1]

$$Vs = K \times Vm$$

where $K = (Cs+Cm)/Cs$ or $K = Cm/Cs$ (if $Cm \gg Cs$)

2. A charging voltage measuring device apparatus for measuring a charging voltage Vs on the surface of a substrate held on a substrate holding unit, comprising:

a measuring electrode, for forming an electrostatic capacity Cs with said substrate, being disposed on said substrate holding unit to make contact with or proximate to the back face of said held substrate, and said measuring electrode being electrically insulated from said substrate holding unit;

a measuring capacitor connected between said measuring electrode and a ground potential portion, said measuring capacitor having an electrostatic capacity Cm;

a voltage measuring unit for measuring a measuring voltage Vm between both ends of said measuring capacitor; and

a calculator calculating unit for calculating said charging voltage Vs at time t1 in accordance with a following numerical expression 2 or its mathematically equivalent numerical expression on the basis of an inverse K of a voltage dividing ratio that is defined by the relation between said electrostatic capacities Cs and Cm, and said measuring voltage Vm(t1) at time t1, and a resistance value Rm of a resistor including an internal resistor of said voltmeter and disposed in parallel to said measuring capacitor, when the time is t, the measurement start time is t=0, and the measurement time is t1.

[Numerical expression 2]

$$Vs = K[Vm(t1)+\{1/(Cm\times Rm)\}\int_0^{t1} Vm(t)dt]$$

where $K = (Cs+Cm)/Cs$ or $K = Cm/Cs$ (if $Cm>>Cs$)

3. An ion beam irradiating device apparatus for irradiating an ion beam onto a substrate held on a substrate holding unit, comprising:

an plasma generating source for generating and supplying electrons to said substrate to suppress the electrification on the surface of said substrate caused by irradiating said ion beam;

a charging voltage measuring device for the substrate according to claim 1; and

a controller unit for controlling an amount of electrons generated from said electron supply source on the basis of charging voltage Vs measured by said charging voltage measuring device;

wherein said control unit controls to maintain said amount of said electrons generated from said electron supply source when said charging voltage Vs is within a reference voltage range,

wherein said control unit controls to increase said amount of said electrons generated from said electron supply source when said charging voltage Vs is higher than said

reference voltage range, and

wherein said control unit controls to decrease said amount of said electrons generated from said electron supply source when said charging voltage Vs is lower than said reference voltage range.

4. An ion beam irradiating apparatus for irradiating an ion beam onto a substrate held on a substrate holding unit, comprising:

an plasma generating source for generating and supplying electrons to said substrate to suppress the electrification on the surface of said substrate caused by irradiating said ion beam;

a charging voltage measuring device for the substrate according to claim 2; and

a control unit for controlling an amount of electrons generated from said electron supply source on the basis of charging voltage Vs measured by said charging voltage measuring device;

wherein said control unit controls to maintain said amount of said electrons generated from said electron supply source when said charging voltage Vs is within a reference voltage range,

wherein said control unit controls to increase said amount of said electrons generated from said electron supply source

when said charging voltage Vs is higher than said reference voltage range, and

wherein said control unit controls to decrease said amount of said electrons generated from said electron supply source when said charging voltage Vs is lower than said reference voltage range.

5. The charging voltage measuring device according to claim 1, wherein said measuring electrode is a conductive plate covered with an insulating layer.

6. The charging voltage measuring device according to claim 2, wherein said measuring electrode is a conductive plate covered with an insulating layer.